Dr. Coates called the attention of the Academy to the whiteness, thinness, and semi-transparency of the specimen exhibited by Dr. Morton, in all the lines usually exhibiting the sutures. This he considered, not only as indicating the previous existence of real sutures, but as corresponding with the views entertained, by some late comparative anatomists, in regard to the analogy of parts. He alluded to those who believe the analogous parts in animal formations to exist to a very great extent indeed, although composed of very diversified materials, and adapted to very different purposes in the various beings in which they exist.

ORDINARY MEETING, August 24, 1841.

Vice President Morton in the Chair.

DONATIONS TO CABINET.

The Society received from the estate of the late William Maclure, through the hands of his brother and executor Alexander Maclure, a five feet Achromatic telescope, 3¼ inches in the aperture, with two terrestrial and two celestial eye-pieces, adjusting screw, &c. It bears the maker's name, —"Lerebours, Quai de l'Horloge, à Paris."

To the Collection of Shells: Voluta pallida, Conus geographicus, Turbinella craticulata. From Mr. Draper.

Bulimus multicolor (Rang) Brazil; and a Helix, probably nondescript, from the Bonin Islands. From Dr. Ruschenberger.

To the Mineralogical Collection: Fine specimens of laminated Selenite, lamellar Sulphate of Strontian and Dog-tooth Spar, from Lockport, N. York. Also, Specular Iron, two specimens, doubly refracting Spar, and a gigantic crystal of Calcareous Spar,—a hexaedron with truncated angles, and weighing 27 lbs.; from Rossie, New York. All presented by Mr. Ashmead.

Fossiliferous Chert, composed of organic remains; radiated nodular Iron Pyrites; Galena and Fossiliferous Limestone, from the vicinity of Sunbury, Penn. And radiated Anthracite from Bear-gap Mine, Dauphin County, Penn. Presented by Prof. Johnson.

DONATIONS TO LIBRARY.

Journal of Boston Society of Natural History. Vol. 3, No. 4. 8vo. 1841. From the Society.

Report on the invertebrate Animals of Massachusetts, comprising the Mollusca, Crustacea, Annelidæ and Radiata. By A. A. Gould. 8vo. Cambridge, 1841. From the Author.

Account of some Parhelia observed March, 1841. By A. D. Chaloner, M. D. From the Author.

The New Harmony Disseminator, complete. From Mrs. Say through Mr. Phillips.

Physiology and Animal Mechanism. From the French by Dr. Ruschenberger. 2d edit. 12mo. From the Translator.

Calcutta Journal of Natural History. Conducted by John McClelland. Nos. 1, 2, 3 and 4. 8vo. Calcutta, 1841. From the Editor.

The following works, which once formed part of the Library of the Knights of Malta, were presented by Mr. Thomas Ryan:

R. P. Martini Becani Theologia Scholastica. 2 vols. 12mo. Paris, 1617 and 1622.

Breve trattato de Cristo, de Emmanuele Santz. 4to. Catania, 1691.

Opere del Nicolo Causino. 12mo. Venizia.

Les Devoirs de l'Homme. Traduit du Latin de Pufendorf, par Jean Barbeyrac. 12mo. Amsterdam.

Ordinanze Militari. 4to. Malta, 1777.

L'idea del Cavalier, mostrato nella vita di Agostino Grimaldo. 4to. Messina, 1662.

De Vermaarde Reizen van Heer Vincent le van Marsilien. 4to. 1654. Amsterdam.

Two Theological MSS. beautifully written, and bound in Quarto.

Written Communication.—Mr. Speakman submitted some views on the nature of Light and Heat; which communication was referred to a committee composed of Dr. Goddard, Mr. Lukens and Dr. Griscom.

Verbal Communications.

Professor Johnson exhibited several specimens of *crystalloid* anthracite and bituminous coal, and stated some of the circumstances which seem to determine the assumption by this mineral, of certain figures, contrary to the assertion of many mineralogists that it has no definite form.

The forms which anthracite occasionally presents are, 1. *Ovoid*, which causes it, in breaking, especially when the fracture takes place from long exposure to the atmosphere, to fall into spheroidal masses with salient portions strongly reminding us of truncated angles in ordinary crystals. This figure has often been observed in one of the beds of anthracite found on Beaver creek; and a large specimen furnished by Mr. Jacob Thomas of Beaver Meadow, was exhibited, showing the truncated borders along the lines of separation in a very remarkable manner, and also displaying beautiful iridescent colours. It was remarked that coal affecting this form, is frequently found to leave a considerable portion of oxide of iron among its earthy residue; but that the whole of the latter was not usually a large per centage of the coal.

2. The next definite form mentioned as affected by coal, is a *radiated* structure well characterized in several specimens from the third bed, from the bottom of the formation at Bear-gap, Dauphin county, Penna. This structure was likewise illustrated in a sample of Welsh bituminous coal. The radiations generally proceed from two points at no great distance from each other and forming two sections of conical surface, unite at certain distances from their points of departure into a single cylindrical section near the termination of the rays. The exterior of these radii is of a silky lustre, striated, and sometimes interrupted by the interposition of fragments of organic remains, in the state of fossil charcoal. Very large stems are occasionally found with radiated, crystalloid anthracite adhering to the opposite sides, the directions of the striæ being on the two sides very nearly the same.

3. The rhombic hexaedron was exhibited in a well marked specimen of anthracite adhering to its accompanying slate. Few mineral forms are better defined than this mass of anthracite. The angles can be determined with the goniometer with tolerable precision, liable however to the slight uncertainty arising from the presence of organic bodies, tending to oppose the crystalline arrangement.

4. An octahedron with tolerably well-defined faces striated in different directions on the adjoining sides, was exhibited, and the circumstance of possessing a large portion of earthy matter was noticed, as belonging to many samples of coal which exhibit this exterior aspect.

The presence of several well marked crystalloid forms being thus established, Prof. Johnson adverted to the argument which such forms had been supposed to furnish against the vegetable origin of coal, and stated that in the very samples under examination were seen the most incontrovertible evidences of the source from which not only bituminous coal, but anthracite also had been derived. In one and the same specimen of the latter, were seen mineral charcoal, natural coke, and true anthracite, indicating as well the vegetable origin of all, as the process of formation, by which the last two had probably been derived from the intermediate state of bituminous coal.

In accounting for the supposed impossibility of crystalline structures being formed out of organic matter, he observed that a distinction is to be drawn between *organic elements* and *organized substances*, and that the *former* may often be so proportioned, when derived by distillation, fermentation or other chemical reaction from the latter, as to be capable of assuming definite figures. The production of coal from vegetable bodies is supposed, on all hands, to have resulted from a slow chemical decomposition of the latter and the establishment of new orders of affinity between the original constituent atoms. The carbon as well as the other materials of vegetables was by this process reduced, at least in part, to the condition of ultimate molecules, instead of being merely mechanically divided into small particles. It would therefore be capable of obeying any law of movement which either its own affinities or those of the earthy constituents which had entered into the composition of the vegetables from which it had been derived, might tend to impress. That it is the earthy constituents which determine the forms assumed by coal, seems probable from the fact that the more earthy residuum of a particular kind any coal contains, the more prone does it appear to be to assume a crystalloid structure.

Reference was made, in this connexion, to those cubic, rhombic and columnar structures which often occur in both anthracite and bituminous coal, and which not unfrequently exhibit to the eye, especially after partial incineration, the clearest evidence of a tendency among the earthy ingredients to regulate the arrangement of forms throughout the whole mass. Prof. Johnson also stated that the result of a considerable number of analyses of the ashes of coal, appeared to favour the presumption that the two principal constituents, silica and alumina, are in definite proportion to each other,

and may therefore have a power of assuming definite forms. The oxide of iron in the ashes is commonly derived from the decomposition of pyrites, while the lime and magnesia in the coal are probably in the state of carbonates, unless where the production of sulphuric acid by the decomposition of the pyrites has converted the former into gypsum and the latter into epsom salt. From this latter play of affinities the carbonate of iron would be produced, and subsequently the sesquioxide, often seen covering the interstices of outcrop coal and forming bog ore in the springs which proceed from coal seams, the coal in the meantime retaining the form impressed by the agency of the silicate of alumina, and having a portion of its interstices or those of the underlying slates filled up with crystallized sulphate of lime.

Admitting the justness of this view of the causes which produced crystalloid forms in coal, we have no more difficulty in accounting for the number of different forms which it occasionally exhibits than for the analogous variety in regard to other minerals; the carbonate of lime, for example, which, as is well known to mineralogists, takes on a far greater number of distinct forms.

Prof. Bailey stated, that he had recently examined specimens of Calcareous marl from the cretaceous formation discovered by J. N. Nicollet, Esq., on the Upper Missouri, above the mouth of the Sioux river. These specimens proved to contain fossil Foraminifera, (Polythalamia of Ehrenberg,) similar to those previously detected by Prof. Bailey in the calcareous portions of the same formation in New Jersey and Alabama.

He also mentioned certain silicified wood found near Fredericksburg, Va., in the feldsphalhic sandstone, called by Prof. W. B. Rogers "upper secondary sandstone." This wood is in a peculiar state of preservation, the vegetable matter having been completely replaced by silica, without any filling up of the cells or tubes. In consequence of this state of the wood, it is easy to subject it to microscopic examination without the trouble and expense of forming polished slices. All that is required is to break off thin pieces with the point of a knife and moisten them; they then show the most delicate markings of the tissue beautifully preserved. The discs with concentric rings, and other characters peculiar to Coniferæ, are so distinctly visible as to leave no doubt, that this wood which is commonly called in Fredericksburg, "Petrified hickory," is really fossil pine. In the same formation, fossil plants of the family Cycadeæ, have been detected.